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HIERARCHICAL LEVEL OF MANAGERS' ABILITIES
A Moderator between Quality Management Practices and Company Financial Performance*

Wakhid Slamet Ciptono

This study investigates the moderating impacts of hierarchical level of managers' abilities on the form and strength of all structural relationships between quality management practices and company financial performance. This study describes the structural relationships among the research constructs —six critical factors of quality management practices (quality improvement program, supervisory leadership, supplier involvement, management commitment, training to improve products/services, cross-functional relationships); the contextual factors of oil and gas companies—world-class performance in operations (world-class company practices, operational excellence practices, company non-financial performance); and company financial performance. It uses a sample of 1,332 managers in 140 strategic business units (SBUs) within 49 oil and gas companies operating in Indonesia. The empirical results indicate that the goodness-of-fit of the unconstrained model is much better than that of the constrained model, and this is an indicator that hierarchical level of managers' abilities moderates all structural relationships among the research constructs. Hence, the hierarchical level of

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managers' abilities acts as a moderating variable of the whole model (i.e., among critical factors of quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance). It means that the major contribution of the hierarchical level of managers' abilities is how to make changes in the organizational system. Top level managers' abilities are deemed the most capable of making significant changes because of their broad sources of power and influence. Conversely, lower level managers' abilities find it more difficult making significant changes in the system because of bureaucratic control processes that limit their actions — powerlessness or a chronic lack of autonomy. Compared to the hierarchical level of managers' abilities, the degree of autonomy may be a more comprehensive contribution in reference to managers' abilities to influence an organizational system. Autonomy may not only act as a person enhancer to increase internal work motivation, but it may also serve to moderate the extent to which individuals are able to significantly influence a system. In addition, involvement and empowerment of all organizational members (including managers) in cooperative and collaborative (interactive) efforts to achieve quality improvements appear to be a key element to TQM. Results further reveal that world-class performance in operations (world-class company practices, operational excellence practices, and company non-financial performance) positively mediates the impact of critical factors of quality management practices on company financial performance. Results also point out that three out of six critical factors of quality management practices are positively associated with world-class company practices and operational excellence practices under the moderating of hierarchical level of managers' abilities. World-class company practices and operational excellence practices have direct and significant effects on company non-financial performance. Furthermore, empirical results suggest that there is a positive and significant relationship between company non-financial performance and company financial performance.

Keywords: company performance; critical factors of quality management practices; hierarchical level of managers' abilities; operational excellence practices; world-class company practices

Introduction

International business is not a new phenomenon; however, the volume of international trade has increased dramatically over the last decade. Phatak (1997) defines international business as a business activity of private or public enterprises involving the movement across national boundaries of resources, goods, services, knowledge, or skills. Nowadays, every nation and an increasing number of companies buy and sell products in the international marketplace. A number of developments in regions around the world have helped to fuel this activity (Hodgetts and Luthans 2000). The world of international business is changing rapidly, and one primary reason is because increased foreign investments and trades are bringing managers from one country into ongoing contacts with other managers in other countries. Companies failing to adapt to and learn the complexity of the new environment tend to experience, sooner or later, survival problems. In this climate of change, the development, implementation, and use of adequate performance measurement and management frameworks are the major challenges confronting organizations, and consequently can significantly contribute to the organizational success.

The opening news story focuses on the growing realization of what is required to succeed and survive in today's international market. Companies that once served a specific geographic area or serviced a specific need have learned to compete with three "Any's" environment (Anybody, Anywhere, Anytime). Realizing the need for diversity in order to compete in the new millennium, more and more multinationals find that it is essential to be proactive and interactive –seizing opportunities, recognizing obstacles, and anticipating (not just responding) changes– if they want to be not only total quality organizations, but world-class organizations. Total quality is a major issue for multinational companies in the new millennium. One major reason is that in the international marketplace, customers do not care about who provides goods and services they want; they simply require that their expectations be met or exceeded. To meet or exceed customer expectations, at minimum the multinational companies (MNCs) must pay attention to quality as well as cost. Accordingly, a technology paradox is inherent in this total quality emphasis, and, of course, innovation takes on new importance (Hodgetts and Luthans 2000).

What are MNCs doing to develop and sustain a competitive edge? They employ a number of strategies that best can be summarized in terms of three stages or paradigm shifts through which organizations must progress to compete in today's Three Any's environment —from total quality, adaptive organizations to anticipative learning organizations to being simply the best, world-class organizations (WCOs). World-class organizations (WCOs) are enterprises that are able to compete

with anybody, anywhere, anytime. WCOs have operations throughout the globe. To become a WCO, an organization must excel in a number of dimensions that in both an additive and synergistic way create a new level of competitive excellence that goes beyond the total quality and learning organizations. Many companies now participate in an international market, which offers huge opportunities for broadening the customer base, with the associated drawback of increased competition. To be successful, companies must draw up realistic business strategies (Al-Hassan et al. 2000). These strategies in the global business environment present multiple-edged challenge for Indonesian companies (including oil and gas business). When venturing abroad, they will face regional and world competitors while at home, they are likely to face the same competitors and additional domestic rivals.

To be successful, Indonesian oil and gas players must develop products and services that can compete in terms of quality and cost, and that meet international standards. In addition, Indonesian oil and gas companies must be able to create appropriate international management abilities to support their excellence business strategies (Young 1994). Indonesia needs to create both workforces of skilled labors able to work with advanced technology and professional managers. It is not enough for these managers to have the abilities to operate the business on a day-to-day basis. They also need the mind-set to constantly monitor the changing international environment, then to anticipate and adapt quickly to fast-moving international developments and competitors. These challenges are hardly different from those the other international companies face; the difference is that companies with international experiences have an earlier start. Increased competition has motivated managers in business organizations to evaluate their competitive strategies and management practices with the aim at improving organizational performance. With a diminished workforce and the need for sustaining performance, organizations are striving to define, implement, and sustain Total Quality Management (TQM) practices. This is a management philosophy that integrates strategy, management practices, and organizational outcomes — a quality organization that continuously improves and sustains performance (Terziovski and Samson 1999).

As a means to improving an organization's performance, the principle of Total Quality Management (TQM) has been widely utilized by public and business organizations since the end of 1980s (ByeoungGone 1997). The basic purpose for an organization is to reach a desired steady state. The steady state usually means long-term organizational effectiveness and survival (Kast and Rosenzweig 1972). The organizational goal prescribed by TQM is to establish quality enhancement as a dominant priority (Hackman and Wageman 1995; Spencer 1994; Wang 2004). TQM philosophy reveals

that only through quality enhancement, an organization can obtain long-term effectiveness and survival. Thus, the basic purposes of a TQM organization are to reach organizational effectiveness and to ensure the existence and sustainable development of the organization (Domingo 1996).

According to Wang (2004), one question arises here is "what do long-term organizational effectiveness and survival mean?" In the TQM paradigm, long-term organizational effectiveness and survival mean satisfying customers. Customers can be defined broadly; it may involve internal customers and external customers (Evans and Lindsay 1996). Hence, the phase "satisfying customers" can mean satisfying every human being in our society. In other words, the purposes of TQM organizations should include the employees' personal fulfillment (satisfying internal customers) and the organizational contributions to the society (satisfying external customers) (Miller 1992). In addition, a set of company performance measurements that incorporate satisfying internal as well as external customers are needed to measure the organizational performance and improvements (Tatikonda and Tatikonda 1996a, 1996b; Urdan 2004; Vokurka and Fliedner 1995).

To deal with the challenge in achieving long-term organizational effectiveness and survival, an organization must develop continuous process improvement and innovation in order to gain a better understanding of a successful TQM implementation (Nonaka et al. 2003.; Spencer 1996; Trott 2004). The implementation of total quality management (TQM) cannot be successful without utilizing suitable quality management methods or QMMs (Kanji and Asher 1996; Mann and Kehoe 1994; Zhang 2000). An access to appropriate QMMs has been put forward as vital for successful quality work. The use of QMMs is an essential component of any successful quality process improvement and innovation (Bunney and Dale 1997; Tidd et al. 2005). QMMs play a key role in the companywide approach to continuous process improvement and innovation (McQuater et al. 1995; Mann and Kehoe 1994, 1995). Zhang (2000) states that there is a widespread consensus that using QMMs is a way of managing an organization to improve its overall long-term organizational effectiveness and survival. There is less agreement as to how many QMMs actually exist and what the effects of QMMs on company performance are.

To be effective, quality management methods (QMMs) should be categorized into critical factors of quality management practices (QMP). This suggests that organizations pursuing their long-term effectiveness and survival should be designed consistent with quality management practices implemented by the organizations' TQM strategic choice. Accordingly, it may be argued that organizations whose long-term effectiveness and survival are consistent with their quality management practices will outperform those whose long-term effectiveness

and survival performance are not consistent with their quality management practices. This issue, however, has not widely explored in the literature (Tamimi and Gershon 1995; Zhang 2000). Evidence on the structural relations between quality management practices (critical factors of TQM) and company performance (non-financial and financial) is still limited.

This study is designed to fill this gap. In addition, attempts are needed to realize that a successful TQM implementation model needs not operate in isolation from other change initiative programs, such as operational excellence practices, world-class company practices, and company performance—they could be integrated (Patterson and Engelkemeyer 1989). As a further effort to renew the interest in TQM practices, all SBUs along the supply-and demand-chains in the oil and gas industry begin to realize that they depend on each other and that poor quality from one partner SBU mushrooms to affect the others (Hakim 1996). The present research is designed to evaluate the moderating effect of hierarchical levels of managers' abilities on the form and strength of the relationships among quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance (the whole model). Theoretical supports for the constructs used in this investigation come primarily from the strategic operations, management, and human resource management disciplines.

The paper is structured as follows: firstly, the author reviews the theoretical context and outlines the hypotheses; secondly, the author describes the research methodology; thirdly, the data analysis and results are then presented; fourthly, the findings, limitations, and conclusions are provided; finally, the author reflects on the implications of the study and concludes with some suggestions for future research.

Theoretical Context and Hypotheses

This study is concerned with 9 latent constructs and 1 observed variable (company financial performance). The author has developed a framework of the study (Figure 1) to illustrate how critical factors of quality management practices affect company financial performance. In this framework, the researcher argues that six critical factors of quality management practices or QMP (as independent constructs) affect company financial performance or CFP (as a dependent construct) through world-class performance in operations (three mediating constructs: world-class company practices or WCC, operational excellence practices or OE, and company non-financial performance or CNFP). This research framework also investigates the moderating impacts of hierarchical levels of managers' abilities on the structural relationships among the constructs.

All ten constructs are measured with five-point Likert scales. Six items of critical factors of quality management practices (QMP1-6), world-class company (WCC), and operational excellence (OE) measures consist of 28 sub-items, 6 items, and 5 items, respectively. Respondents indicated their agreement/disagreement with each sub-item, using a five-point scale ranging from 'strongly disagree' to 'strongly agree.' A higher scores reflects a higher critical factor of quality management practices, a higher priority in practicing world-class company and operational excellence. The company performance (non-financial and financial) measures consist of 2 items and 3 items, respectively. The measures asked indicate how good the company performance is, using a five-point scale ranging from 'very bad' to 'very good'. A higher score reflects a better company performance. The constructs of this study are operationalized as follows.

Critical factors of quality management practices. Rockart's critical success factor (CSF) approach discusses the concept of "critical factors" in the management literature (Rockart 1979). Rockart (1982) and Freund (1988) define critical factors as the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization (Soliman et al. 2001). They are the few key areas where "things must go right" for the business process improvement. Rockart (1979) argues that managers need appropriate information and should provide disclosure and financial transparency on their management functions/operating processes, and that performance in each area should be measured continually. The performance of processes does not suddenly improve or degrade—it changes gradually (Cokins 2004). It follows that such information should be made available by organizations, as necessary, for enhancing company performance. In addition, a comprehensive set of CSFs of TQM or critical factors of quality management practices (QMPs) is needed to make better improvement efforts in the organization. Improvements will occur in quality performance, and ultimately result in improved non-financial (value gains) performance and financial (monetary gains) performance for the organization (Cokins 2004).

Six critical factors of quality management practices (QMP1-6) are operationalized using a set of 50 quality management methods. These 50 quality management methods (QMMs) can be explained and summarized by a smaller set of meaningful factors of quality management practices (i.e., six critical factors of quality management practices) using exploratory factor analysis. The six critical factors of quality management practices may be interpreted, respectively, as quality improvement program, supervisory leadership, supplier involvement, management commitment, training to improve products/services, and cross-functional team relationships among

SBUs. 50 quality management methods are developed to measure Deming's 14 points based on a thorough literature review focusing on the writings of Ahire et al. (1996), Saraph et al. (1989), Tamimi (1995, 1998).

World-class performance in operations: The Contextual factors of oil and gas industry. Wright and Geroy (2001) argue that world-class performance in operations is derived from a complex set of interacting practices between world-class company and operational excellence —the contextual factors of oil and gas companies. In developing world-class performance in operations, the researcher considers that most of SBUs in the Indonesia's oil and gas industry are cost centers. They rely much on non-financial performance. In addition, if the company's non-financial performance is excellent, then world-class company and operational excellence may be sufficient to gain better financial performance and to lead to business success.

The characteristic of successful TQM implementation program encourages organizations to address quality on a broad range of issues (i.e., world-class performance in operations — world-class company practices, operational excellence practices, and company non-financial performance). Companies that wish to compete in the world-class standards must produce evidence of leadership and commitment, initiate verifiable cross-functional communications, address the happiness and well-being of the workforces through rewards and recognition, and, above all, work toward achieving long-term objectives goals.

World-class company practices (WCC). WCC is operationalized using 67 Hayes and Wheelwright dimensions. Hayes and Wheelwright (1984) developed their concept of world-class manufacturing based on six principles. Specifically, confirmatory factor analysis is employed to determine whether Hayes and Wheelwright's 67 dimensions have positive and significant effects on the six principles of world-class manufacturing. The measure was developed by Flynn et al. (1999). The term "world-class company practices" is used since these firms are associated with outstanding performance in the global oil and gas industry.

Operational excellence practices (OE). In the pursuit of global competitive advantage, it is increasingly important to execute the organizations' vision and mission by focusing on operational excellence consistently (Allen and Kutnick 2002; U.S. NAVAIR 2002). Operational excellence reflects the organization's adoption and regular processes for assuring essential global management system standards by implementing all aspects of organizational development (Mandell 1999). Implementing operational excellence requires total quality management (TQM) and reengineering practices (Parker 1999). According to Parker, operational excellence is superior to TQM and reengineering as it changes work processes fundamentally. Opera-

tional excellence is a management philosophy that demands for introspection action, and a focus on continuous process improvement and quantum leaps innovation (TQM and Reengineering). Parker (1999) defines operational excellence as the systematic management of safety, environment, health, reliability, and efficiency (SEHRE) while achieving a world-class organization. OE is operationalized using five dimensions of operational excellence practices — safety, environment, health, reliability, and efficiency. The measure is adapted from Parker (1999) and ChevronTexaco's program (2003).

Company performance. Performance measurement is very important for the effective management of an organization (Demirbag et al. 2006). According to Deming, without measuring something, it is impossible to improve it. Therefore, to improve organizational performance, one needs to determine the extent of critical factors of quality management practices and to measure their impacts on company performance (Madu et al. 1996; Gadenne and Sharma 2002). Among the TQM proponents, the work of Deming (1982, 1986) is perhaps the most relevant to understanding connections between total quality (critical factors of quality management practices) and work performance and the management of such performance (company performance) (Waldman 1994). Company performance includes both company non financial performance or value gains (quality of products/services, delivery of products/services, variety of products/services, customer satisfaction, employee satisfaction, community involvement) and company financial performance or monetary gains (financial performance—net income, profits, profit margin, market performance—increased market share, sales volume, and operating costs and efficiency) (Carpenter and Sanders 2007; Cook and Verma 2002). Company performance is operationalized as the ability of the company to increase its operating performance. The measures are adapted from Cook and Verma (2002). Company financial performance (CFP) consists of three items (sales, net profit margin, and return on assets) whereas company non-financial performance (CNFP) consists of two items (productivity and operational reliability).

Linkage between quality management practices and company financial performance. Various empirical research was involved in developing the impact of quality management practices on overall company performance, and has reported mixed results (Gale 1994; Powell 1995). This may suggest that the achievement of company financial performance from quality management practices is related to a complex relationship between the contextual factors of organization and market variables (Maiga and Jacobs 2005). The adaptation of quality management practices in the contextual factors of the organization has attracted the attention of numerous authors. The literature has discussed such contex-

tual issues as the need for establishing world-class performance in operations —world-class company practices and operational excellence practices, and company non-financial performance as the mediating variables between quality management practices and company financial performance (Wright and Geroy 2001; Hayes and Wheelwright 1984; Allen and Kutnick 2002; Ittner and Larcker 1998). The leveraging of world-class performance in operations, much as the leveraging of operation economies, results in a reduction in overall costs (operational excellence and company non financial performance), allowing the firm to become more price competitive and accordingly more successful (Cort et al. 2007). Companies capable of minimizing overall costs are able to efficiently provide customers with its market offerings, thus maximizing returns to the firm. Therefore, the author theorizes a positive relationship between quality management practices and company financial performance through the mediating variables of world-class company practices, operational excellence practices, and company non-financial performance (fully mediation). Consequently, the author tests the following hypotheses:

H1a-f: All six critical factors of quality management practices have direct and significant effects on world-class company practices.

H2a-f: All six critical factors of quality management practices have direct and significant effects on operational excellence practices.

H3: World-class company practices have a direct and significant effect on company non-financial performance (productivity, operational reliability).

H4: Operational excellence practices have a direct and significant effect on company non-financial performance (productivity, operational reliability).

Linkage between Company Non-Financial Performance (CNFP) *and* ***Company Financial Performance (CFP)***. The relationship between financial and non-financial measures of organizational performance has long been discussed in organization and strategy literature. Hackman and Wageman (1995) provide an insightful account of conceptual and practical issues in researching TQM implementation and change. York and Miree (2004) argue that non-financial performance such as improved quality, innovativeness, and increased market share should actually reduce costs, and thus has a positive effect on the measures of financial performance. Increased quality helps oil and gas industry retain current customers and create greater customer loyalty, which in return may increase market share and financial performance (Rust et al. 1994).

Although the studies of oil and gas industry performance and TQM relations do not examine non-financial

performance measures directly, evidence from larger organizations supports the argument that operational performance indicators are related to financial performance dimensions (Fuentes-Fuentes et al. 2004). Some other studies also demonstrate a positive relationship between operational performance dimensions such as product quality (Larson and Sinha 1995), innovation, and R&D (Prajogo and Sohal 2001; Singh and Smith 2004), employee performance (Fuentes-Fuentes et al. 2004) and customer satisfaction (Ittner and Larcker 1998) and financial performance (Demirbag et al. 2006). According to Ittner and Larcker (1998), non-financial indicators of improvement in areas such as quality, customer or employee satisfaction, and innovation may be better predictors of future financial performance than may historical accounting measures. Hence, they should supplement financial measures in internal accounting systems (e.g., Deloitte Touche Tohmatsu International 1994; Kaplan and Norton 1996). The same discussion has produced calls for disclosure of non-financial information on the drivers of firm value (e.g., Wallman 1995; Edvinsson and Malone 1997, and Stewart 1997). A report by the American Institute of Certified Public Accountants (1994), for instance, concludes that companies should disclose leading, non-financial measures of key business processes such as product quality, cycle time, innovation, and employee satisfaction (Ittner and Larcker 1998). Based on these reasons, the researcher finds that company non-financial measures are leading indicators of company financial performance. Therefore, the author expects a significant positive relationship between company non-financial performance and company financial performance. More formally:

H5: Company non-financial performance is positively associated with company financial performance.

Hierarchical level of managers' abilities as a moderator. In this study, a multiple informant sampling unit (a stratified random sampling)—three levels of managers' abilities—is used to ensure a balanced view of the structural relationship among the research constructs (as a moderating variable). Data were collected from the most informed respondents (1,332 managers) with different level of manager's ability (Ruekert and Walker 1987). The sampling units were 354 top level managers (Board of Directors and Team Manager), 447 middle level managers (Team Leaders), and 531 low level managers (Team Supervisors) at the SBU level of the Indonesia's integrated oil and gas companies — upstream chain, and downstream chain of oil and gas energy.

Total quality management (TQM) has been defined as "a philosophy or an approach to management" made up of "a set of mutually reinforcing principles, each of which is supported by a set of practices and techniques" in the entire organization as a total system approach (Dean and Bowen 1994 in

Hemsworth et al. 2005). The literature of TQM widely accepts that the success of TQM implementation is guaranteed when the responsiveness for quality is extended throughout all levels of managers' abilities in the organization (the whole organization as a total system). For this reason, three levels of managers' abilities (top, middle, and low levels—Level 1, 2, 3) are given greater totally consideration during the implementation of a TQM strategy. Mintzberg (1983) in Waldman (!994) argues that the moderating effect of hierarchical level of managers' abilities makes changes (i.e., continuous process improvement) in the whole organization as a total system. In other words, the hierarchical level of managers' abilities moderates the whole model of the study (all structural relationships). More formally, it can be stated:

H6: The hierarchical level of managers' abilities (Level 1, 2, 3) moderates all structural relationships between quality management practices and company financial performance.

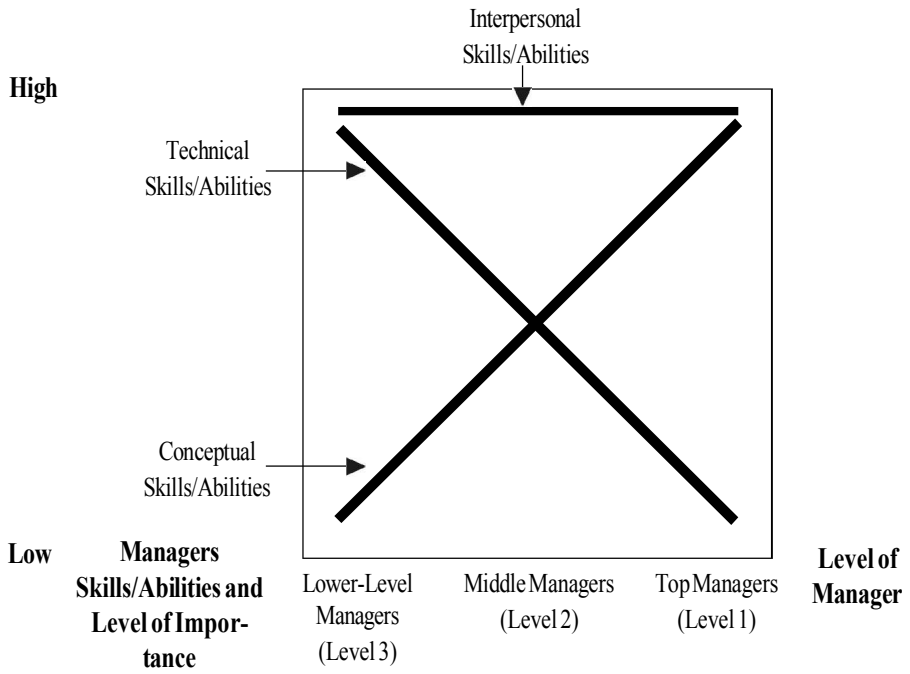
Deming built a case that the central problem of management is an incorrect understanding of variation in performance phenomena, including the company performance. These causes were seen by Deming as being separate from the management system in which the individual operates, not commonly affecting by other workers. In addition managers are responsible for correcting system-based causes of performance. "No amount of care or skill in workmanship can overcome fundamental faults in the system" (Deming 1986 in Waldman 1994). TQM proponents have been quick to criticize performance appraisals that are based on the assumption that an employee is mainly in control of his or her performance (Deming 1986; Scherkenbach 1985; Scholtes 1987; Walton 1986 in Waldman 1994).

Deming suggests that employees work in a system; the creation and perpetuation of which are the responsibilities of management (i.e., hierarchical level of managers' abilities—top, middle, and low levels of managers). These suggestions are addressed as a total system-focused framework of performance, developed and illustrated by considering TQM implementation. The moderating effect of hierarchical level of managers' abilities on the form and strength of the relationships among quality management practices, world-class performance in operations (world-class company practices, operational excellence practices, and company non-financial performance), and company performance is derived from the discussion of Dobbins et al. (1991). Dobbins et al. note that even a system-based approach to work performance should include the increasing importance of person factors at higher management levels, independent of the system (as a moderator). Hence, the higher the level, the more the performance of managers is due to inherent abilities and motivation (managerial skills/abilities).

Hambrick and Finkelstein (1987) define managerial quality as due in part from its ability and motivation to effectively enact discretion. Specific managerial characteristics involved in enacting discretion may include such factors as cognitive complexity and aspiration level (Waldman 1994). Research by Katz (1974) finds that managers need three essential skills or abilities: technical, human (interpersonal), and conceptual skills. He also finds that the relative importance of these skills or abilities varies according to the manager's level (the hierarchical level of managers) within the organization. Figure 1 shows the relative importance of the different skills/abilities at the three management levels: top, middle and lower (Robbins et al. 2003).

Technical Skills/Abilities. First-line managers, as well as many middle managers, are heavily involved in technical aspects of the organization's operation. Technical skills/abilities include the knowledge of and proficiency in a certain specialized field, such as engineering, computing, finance, or manufacturing. For example, accounts payable managers must be proficient in accounting and rules and standardized forms such that they can resolve problems and answer questions that their accounts payable clerks might encounter. Katz (1974) proposes

Figure 1. **Relative Importance of Managerial Skills/Abilities at Different Organizational Levels (Levels of Manager—Level 1, 2, 3)**



Source: Hitt et al. (2005): 33

that technical skills/abilities become less important as a manager moves into a higher level of management, but even top managers need some proficiency in the organization's specialty. For instance, senior executives with an engineering background, working for a resource company like oil and gas company, are likely to use their engineering skills/abilities frequently in their position as managers when they come to handle exploration projects.

Interpersonal Skills/Abilities. Human or interpersonal skills/abilities represent the ability to work well with and understand others, build cooperative efforts within a team (to lead), motivate and manage conflicts. These skills/abilities are important to managers at all levels. Managers need to be aware of their own attitudes, assumptions and believes, as well as being sensitive to their subordinates' perceptions, needs, and motivations. It should be noted that these skills/abilities, which ten years ago were regarded as 'soft', are the skills of the industry that the Task Force of Leadership and Management Skills/Abilities recognize as of crucial importance in successful management practices in Australia as well as globally. Katz (1974) identifies major shortcomings among many Australian managers in communicating, motivating, leading, delegating, and negotiating skills. Because managers deal directly with people, interpersonal skills are crucial. In fact, Katz (1974) reveals that interpersonal skills/abilities remain just as important at the top level of management as they do at the lower levels. Managers with good interpersonal skills/abilities are able to get the best out of their people. They know how to communicate, motivate, lead, and inspire enthusiasm and trust.

Conceptual Skills/Abilities. Managers must also have an ability to conceptualize and to think about abstract situations. They must be able to see the organization as a whole and understand the relationships among various subunits and to visualize how the organization fits into its broader environment. Why? These abilities are essential to effective decision making, and all managers are involved in making decisions. Conceptual skills/abilities are needed by all managers at all levels, but Katz (1974) proposes that these skills/abilities become more important in top management positions. The reason for this is that upper-level managers often deal with abstract ideas, whereas lower-level managers normally spend more time dealing with observable objects and processes. Organizations (particularly large organizations) have many levels. In this study, the researcher uses the types of managers based on three different hierarchical levels: top level, middle level, and frontline (low level).

Top-Level-Managers (Level 1). Top-level managers (Level 1) are the senior executives of an organization and are responsible for its overall management. Top-level managers, often referred to as strategic managers, are supposed to focus on long-term issues and emphasize the survival, growth, and overall effectiveness of the organization. Top

managers are concerned not only with the organization as a whole but also with the interaction between the organization and its external environment. This interaction often requires managers to work extensively with outside individuals and organizations. The chief executive officer (CEO) is one type of top-level manager found in large corporations. This individual is the primary strategic manager of the firm and has authority over everyone else. Others include the chief operations officer (COO), company presidents, vice-presidents, and members of the top management team. Traditionally, the role of top-level managers has been to set an overall direction by formulating strategies and controlling resources. But now, top managers are more commonly called upon to be not only strategic architects but also true organizational leaders. As leaders, they must create and articulate a broader corporate purpose with which people can identify, and one to which people will enthusiastically commit.

Middle-Level Managers (Level 2). As the name implies, middle-level managers (Level 2) are located in the organization's hierarchy below top-level management and above the frontline managers; they are sometimes called tactical managers. They are responsible for translating the general goals and plans developed by strategic managers into more specific objectives and activities. Traditionally, the role of a middle manager is to be an administrative controller who bridges the gap between higher and lower level managers. Middle-level managers take corporate objectives and break them down into business unit targets, put together separate business unit plans from the unit below them for higher-level corporate review, and serve as linchpins of internal communications, interpreting and broadcasting top management's priorities downward and channeling and translating information from the frontline upward. As a stereotype, the term "middle manager" connotes mediocrity: unimaginative people behaving like bureaucrats and defending the status quo. But middle managers are closer than top managers to day-to-day operations, customers, and frontline managers and employees –so they know the problems. They also have many creative ideas– of practical problem solving that keeps the company working.

Frontline (Low Level) Managers (Level 3). Frontline (low level) managers, or operational managers, are lower-level managers (Level 3) who supervise the operations of the organization. These managers often have titles such as supervisor or sales manager. They are directly involved with non-management employees, implementing specific plans developed by middle managers. This role is critical in the organization since operational managers are the link between management and non-management personnel. Traditionally, frontline managers have been directed and controlled from above to make sure that they successfully implement operations in support of company strategy. However, in lead-

ing companies, the role has expanded. Whereas the operational execution aspect of the role remains vital, in leading companies frontline managers are increasingly called upon to be innovative and entrepreneurial, managing growth and new business development. Table 1 describes the transformation of management activities and roles of the three levels of management.

Frontline managers—which usually mean newer, younger managers, are crucial to creating and sustaining quality, innovation, and other drivers of financial performance. In outstanding organizations, talented frontline managers are not only allowed to initiate new activities, but they are expected by their top- and middle-level managers to do so. In addition, they are given freedom, incentives, and supports to find ways.

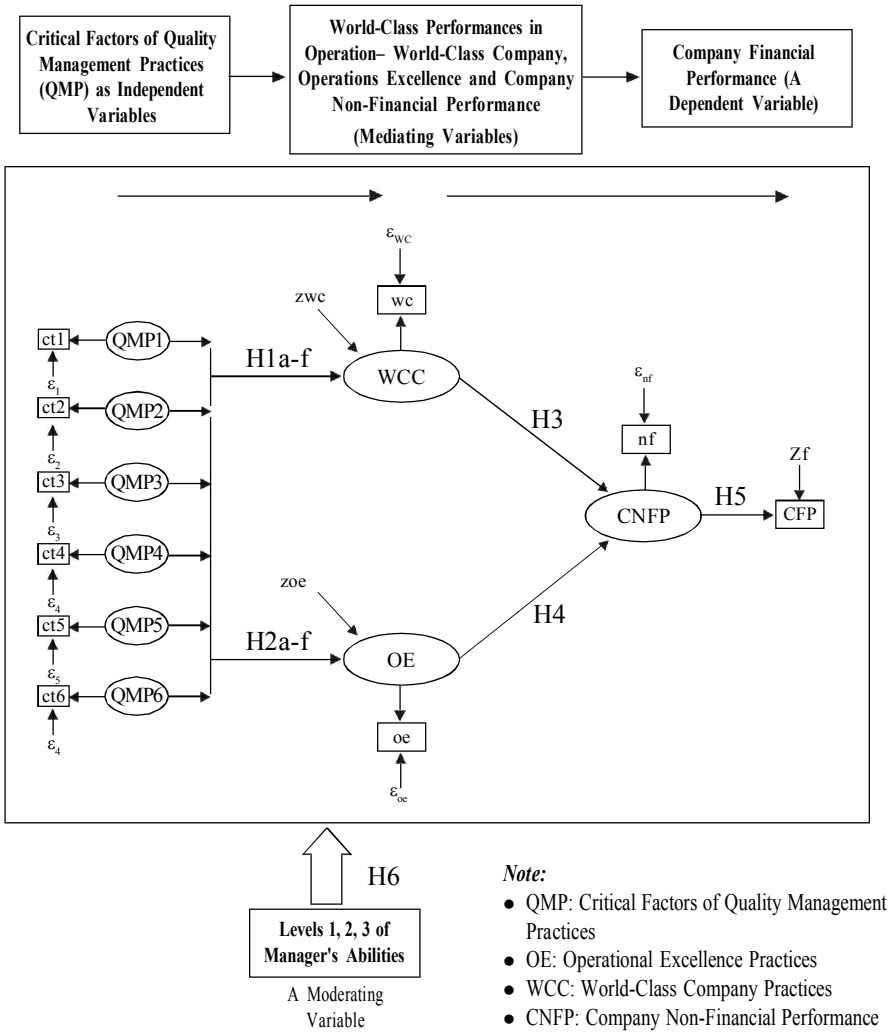
The research framework (Figure 2) identifies 16 structural relationships delineating the factors involved in the association between 10 research constructs for upstream and downstream SBUs. On the basis of a review of the

Table 1. **Transformation of Management Roles and Activities**

	Frontline (Operating) Level Managers—Level 3	Middle-Level Managers—Level 2	Top-Level Managers—Level 1
Changing Roles	From operational implementers to aggressive entrepreneurs	From administrative controllers to supportive coaches	From resource allocators to institutional leaders
Primary Value Added	Driving business performance by focusing on productivity, innovation and growth within front-line units	Providing the support and coordination to bring large company advantage to the independent frontline units.	Creating and embedding a sense of direction, commitment and challenge to people throughout the organization
Key Activities and Tasks	Creating and pursuing new growth opportunities for the business	Developing individuals and supporting their activities	Challenging embedded assumptions while establishing a stretching opportunity horizon and performance standards
	Attracting and developing resources and competencies	Linking dispersed knowledge, skills and best practices across units	Institutionalizing a set of norms and values to support cooperation and trust
	Managing continuous performance improvement within the unit	Managing the tension between short-term performance and long-term ambition	Crerating an overarching corporate purpose and ambition

Source: Bartlett and Ghoshal (1997): 96

Figure 2. **The Research Framework**



diffusion of distinctive operations strategy literature, the author posits six quantitative-deductive research hypotheses to examine the link between six critical factors of quality management practices and company financial performance (sales, net profit margin, and return on assets).

Research Methodology

Steps of the Research

The methodology to be employed in this empirical study involves two distinctive steps. *First*, surveys were conducted at several selected oil and

gas companies. The types of oil and contractor companies were specifically chosen from the Directorate General of Oil and Gas, Republic of Indonesia. The primary objectives of these surveys were to develop a structural relationship model which included the interrelationships among the research constructs, and to analyze the relationships among the research constructs (critical factors of quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance). For the first step, a sample of 140 Strategic Business Units (SBU) within 49 oil and gas contractor companies participated in this study. These qualified samples fell into 47 upstream (supply-chain) companies with 132 SBUs and two downstream (demand-chain) companies with eight SBUs. The surveys were collected for nine months and couriered by the researcher and 11 enumerators for analysis through focus groups meeting, traditional postal questionnaire surveys, and internet or e-mailed questionnaires/web survey to distribute and complete the questionnaires directly at a single point in time (a cross-sectional study). The surveys began in February 2005 and were completed by October 2005.

Second, a statistical methodology was utilized to test seven hypotheses. All variables were tested statistically to determine a well-fitting structural model for the Indonesia's oil and gas industry. The SPSS version 13.0 (Coakes et al. 2006) and AMOS 5.0 were utilized to analyze the data. For statistical analysis of data, general descriptive and advance statistics including factor analysis, multigroup structural equation modeling (MSEM), and hierarchical multiple regression were used.

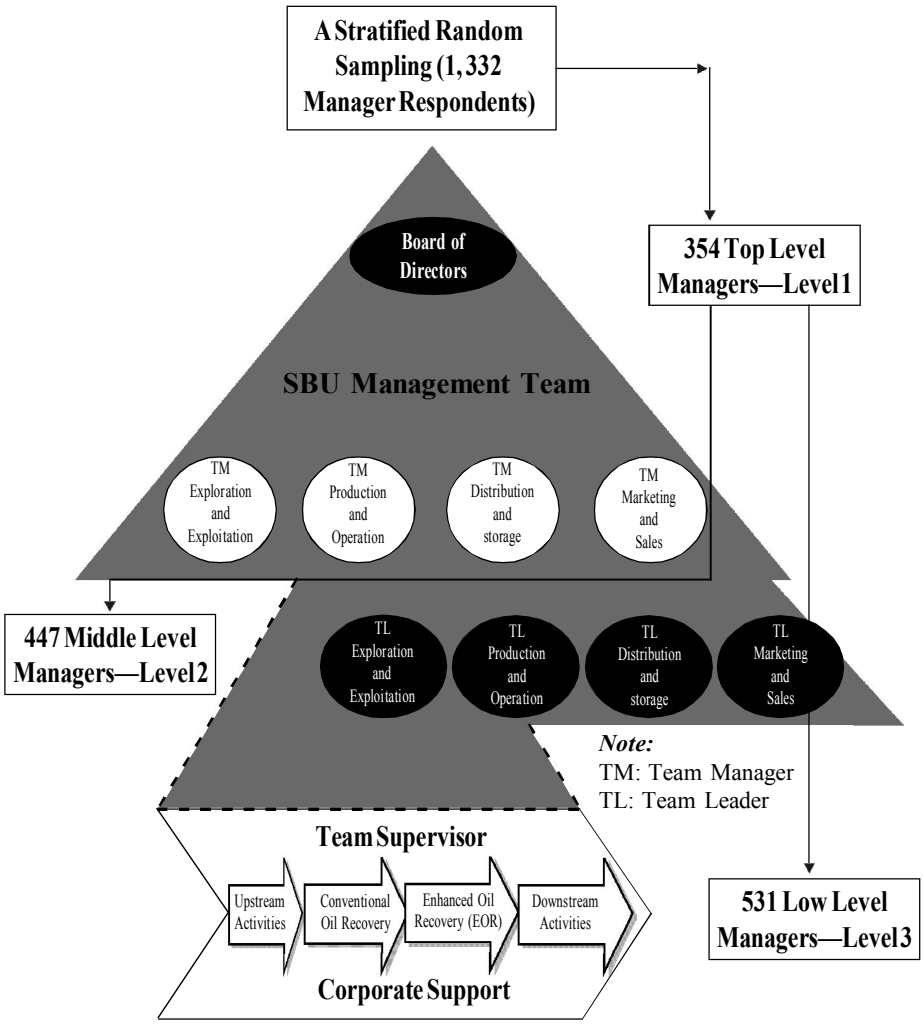
Questionnaire Development

This study uses Likert scaling method to measure managers' perception of critical factors of TQM, world-class company practices, operational excellence, company non-financial performance, and company financial performance. An initial version of questionnaire was developed based on existing questionnaires that had been used in previous studies. Some modifications were made to suit this research context based on in-depth interviews with 30 SBU managers in the Indonesia's oil and gas companies. Reliability and convergent validity assessments after the survey had been accomplished by examining item-to-total correlation and employing confirmatory factor analysis, where several items were dropped for further analysis.

Sample Selection and Data Collection

Two thousand eight hundred questionnaires were distributed to the participating oil and gas companies in a qualified sample of 140 SBUs. An initial sample of 200 SBUs operating in Indonesia was drawn at random from the directory of Directorate Gen-

Figure 3. **A Stratified Random Sampling Unit at the SBU Level of the Organizational Structure (Throughout the Integrated Oil and Gas Industry)**



eral of Oil and Gas, Republic of Indonesia. Each SBU was contacted by telephone and e-mail to assure that individuals with primary responsibilities for the three level of management position were identifiable. It was not possible to contact 12 SBUs because of incorrect contact details. Further 48 SBUs were either unable or unwilling to identify individual managers with the required responsibilities. Each qualified sample of 140 SBUs received 20 questionnaires. Only completely answered responses and research constructs were used.

A total of 1,332 individual usable questionnaires were returned, thus qualified for analysis, representing an effective response rate of 50.19 percent. Of these, 354 were from high level managers, 447 from middle level managers, and 531 from low level managers. At least six questionnaires were returned by qualified sample of 140 SBUs, with 62 SBUs returning more than 10 questionnaires of 20 questionnaires distributed. All 140 SBUs returned questionnaires from their high (top) level managers, middle level managers, and low level managers. According to Black (1994), the typical response rate for a research survey is of the order of 15-20 percent. Figure 2 shows a multiple informant sampling (a stratified random sampling) unit used to ensure a balanced view of the relationships among the research constructs, and to collect data from the most informed respondents (1,332 managers) of different level of managers' abilities (Ruekert and Walker 1987).

An Assessment of Non-Response Bias

An assessment of non-response bias was made using the extrapolation approach recommended by Armstrong (1979). Each individual questionnaire type (high, middle, and low level managers) was categorized according to the date the completed questionnaire was received. Tests reveal no significant differences between early responders (the first wave of responses; n = 442) and late responders (the second wave of responses; n = 890) on any of the constructs. As indicated by a CFI (comparative fit index) of 0.990 for the research model, the multigroup models represent excellence rate to the data. As such, non-response bias in unlikely to be present in this data (Morgan and Piercy 1998).

Multigroup Structural Equation Modeling (MSEM)—Model Fit Assessment

A two-step approach to Multigroup Structural Equation Modeling (MSEM) was employed in this study (Hoyle 1995). MSEM is uniquely suited to test a structural model to different group simultaneously—Level 1, 2, 3 of managers' abilities. MSEM methods do not require cumbersome interaction terms and nested models to estimate hypothesized group differences in path-analytic model coefficients or model fit. A set of goodness-of-fit statistics valuate a set of complex models —one for each group. Differences among group can be evaluated for their appropriateness by freeing some parameters, fixing and/or constraining any or all parameters for different groups. MSEM analysis often begins with estimating a fully constrained model, then relaxing constraints to allow for group-specific differences in particular parameters based on theory or inductive evidence (Purwanto 2003, Yuan and Bentler 2000).

In a two-step process, the measurement model is firstly estimated and then fixed in the second stage

when the structural model is estimated (Howell 1987; Anderson and Gerbing 1988; Purwanto 2003). The measurement model in conjunction with the structural model enables a comprehensive, confirmatory assessment of construct validity. A two-step approach allows the tests of the significance for all pattern coefficients. Convergent validity can be assessed from the measurement model by determining whether each indicator's estimated pattern coefficient on its posited underlying construct factor is significant, that is greater than twice its standard error. The error term of each composite indicator is fixed at $(1-\alpha)\sigma^2$ and the lambda, a loading from a latent construct to its indicator, is calculated as $1=\alpha^{1/2}\sigma$.

Data-model fit assessments are based on multiple indices: (a) the chi-square, chi-square over degree of freedoms (normed Chi-square), and X^2 p-value; (b) the Goodness-of-Fit Index (GFI); (c) the adjusted Goodness-of-Fit Index (AGFI); (d) the Root Mean Square Residual (RMR), Tucker-Lewis Index (TLI); and (e) the Root Mean Square Error of Approximation (RMSEA) (Mueller 1996).

Hierarchical Multiple Regression Analysis

The author examined the results of the structural relationships analysis further to determine the indirect effect of critical factors of quality management practices on company financial performance (Alwin and Hauser 1975). An indirect effect exists when a critical factor of quality management practices (i.e., QMP1-6) influences company financial performance with the mediation of a third dimension. However, to fully capture the effect of the six critical factors of quality management practices on the company financial performance, one must also consider their indirect effects. Indirect coefficients show the impact of critical factors of quality management practices on company financial performance through its influence on a third dimension (world-class performance in operations —world-class company, operational excellence, company non-financial performance).

In this hierarchical multiple regression analysis, independent and mediating variables were entered separately and used to test whether the dependent variable was predictable from the combined independent variables and mediators. To demonstrate mediation, the hierarchical multiple regression analysis requires three regressions to be estimated. *First*, the dependent variable of company financial performance must be predictable from the independent variables (six critical factors of quality management practices). *Second*, the dependent variable (company financial performance) must be predictable from the mediators (world-class performance in operations: world-class company, operational excellence, company non-financial performance). *Third*, the dependent variable (company financial performance) must be predictable from the combined independent variable (six

critical factors of quality management practices), and mediators (world-class company, operational excellence, company non-financial performance). If mediation is occurring, the mediators will be significant in the third equation (Baron and Kenny 1986).

Data Analysis and Results

Reliability Measures

Cronbach's alpha coefficients were computed to estimate the reliability of each scale (observed variable or indicator). Item to total correlation was used to refine the measures and eliminate items whose inclusion resulted in lower alpha coefficients. Items with item to total correlation coefficients less than 0.50 were eliminated. However, items with item to total correlation coefficients less than 0.50 were retained if eliminating those items would result in lower Cronbach's alpha coefficient of the related scale (Hair et al. 2006). The Cronbach's alphas of the measures are ranging from 0.7720 to 0.9106, which, according to DeVellis (1991), are respectable to be very good. Table 2 shows the reliability of the measures and the number of items retained of the constructs.

Validity Measures

After the scales had met the necessary levels of reliability, the scales were assessed for validity. Confirmatory factor analysis was utilized to assess the validity of each scale, consisting of the retained items or manifest indicators. All loadings (path co-

Table 2. **Reliability Coefficients (Cronbach's Alpha) of the Constructs**

Construct	Number of Items in the Questionnaire	Number of Items Retained	Cronbach's Alpha
QMP	6 Items	6 Items	0.8933
QMP1	9 Sub-Items	7 Sub-Items	0.8768
QMP2	7 Sub-Items	5 Sub-Items	0.8643
QMP3	7 Sub-Items	4 Sub-Items	0.8032
QMP4	7 Sub-Items	6 Sub-Items	0.8886
QMP5	6 Sub-Items	3 Sub-Items	0.7720
QMP6	3 Sub-Items	3 Sub-Items	0.8089
WCC	6 Items	4 Items	0.8475
OE	5 Items	3 Items	0.9106
CNFP	2 Items	2 Items	0.8210
CFP	3 Items	3 Items	NA *)

Note: QMP: Critical Factors of Quality Management Practices; WCC: World-Class Company Practices; OE: Operational Excellence Practices; CNFP: Company Non-Financial Performance; CFP: Company Financial Performance

*) Company financial performance (CFP) is an observed variable; hence Cronbach's alpha is not applicable.

efficients or regression weights) from a latent construct to their corresponding manifest indicators are significant (critical ratio values > 1.96). Hence, it provides evidence of convergent validity. This study also assessed the discriminant validity of the latent constructs. Discriminant validity is the degree to which two conceptually similar constructs are distinct. According to Anderson and Gerbing (1988), when the confidence interval of ± two standard errors around a correlation estimate between two factors (constructs) does not include the value 1, that is evidence of discriminant validity for the two constructs. None of the confidence intervals in this study includes one.

Fixing the Error Terms and The Lambdas

A single indicator measured latent constructs of this study; however, in each case, the indicator was a multiple-item scale. It is unlikely that a single indicator perfectly measures a construct; therefore, this study estimated the measurement error terms. The measurement error terms were fixed at $(1-\alpha)\sigma^2$ and the corresponding lambdas –the loading from a latent construct to its corresponding indicator– were fixed at $\alpha^{1/2}\,\sigma$. For the non-latent (observed) variables, the error terms were fixed at 0, and the corresponding lambdas were fixed at 1.

Table 3. **Construct Reliability**

Construct	ε	λ	α
QMP1	0.0186	0.3642	0.8770
QMP2	0.0371	0.4857	0.8641
QMP3	0.0520	0.4625	0.8044
QMP4	0.0210	0.4144	0.8918
QMP5	0.0438	0.4010	0.7855
QMP6	0.0410	0.4158	0.8097
WCC	0.0379	0.8186	0.9465
OE	0.1387	0.5999	0.7218
CNFP	0.0133	0.4778	0.8972
CFP	NA	NA	NA*)

Note: QMP: Critical Factors of Quality Management Practices; WCC: World-Class Company; OE: Operational Excellence; CNFP: Company Non-Financial Performance; CFP: Company Financial Performance*) Company financial performance (CFP) is an observed variable; hence epsilon, lambda, and alpha are not applicable.

The measure of this study consists of indicators that nine latent constructs measure on a five-point scale. Therefore, before fixing the error terms and the lambdas for the samples, the study converted those latent constructs into standard scores (Z scores) by subtracting the mean and dividing it by the standard deviation for each construct. Using standardized variables, the effects due to scale differences were eliminated (Hair et al. 2006). Table 3 provides the reliability of the constructs, lambdas, and error terms.

Differences in Means

Table 4 displays the construct means by levels of management commitment (top, middle, low -level 1, 2, 3). Although no hypothesis is proposed as to mean-level differences, this study presents them for comparative purposes. Results are based on two-tailed t-tests. In general, differences are evident. T-tests for equality of means across samples indicate significant differences in quality improvement program (QMP1), supervisory leadership (QMP2), supplier involvement (QMP3), and training to improve products/services (QMP4). The t-tests also show insignificant differences in top management commitment (QMP5), cross-functional relationships (QMP6), world-class company practices, operational excellence practices, company non-financial performance, and company financial performance. The three levels of managers' abilities have different perspectives in terms of technical aspects, but they have the same perspective in terms of managerial aspects related to the TQM implementation program.

Structural relationships

To test the possibility that level of management moderates the structural relationship among constructs, the study examined two structural models –constrained and unconstrained models. In the constrained model, the study fixed the estimated regression weights (paths) such that estimated paths in the constrained model from top manager sample were equal to those from middle managers and frontline managers. The goodness-of-fit of the fully constrained model is as follows (Table 5): Chi-square = 167.672 (df = 15, X^2 p-value = 0.000); GFI = 0.976; AGFI = 0.911; RMR = 0.016; TLI = 0.937; and RMSEA = 0.087. In the unconstrained model, the study freed the estimated regression weights (paths) –fixed in the constrained model– such that estimated paths might vary between paths from top managers sample and those from middle and frontline managers sample. The goodness-of-fit of the unconstrained model is as follows (Table 5): Chi-square = 19.024 (df = 12, X^2 p-value = 0.088); GFI = 0.990; AGFI = 0.952; RMR = 0.005; TLI = 0.987; and RMSEA = 0.041.

The goodness-of-fit of the unconstrained model is much better than that of the constrained model (Table 6). This is an indicator that level of managers' abilities moderates all structural relationships among the research constructs (H6 is accepted).

Table 4. **Mean Difference**

Constructs	Level of Managers' Abilities	N	Mean	Sig.
QMP1 (Quality Improvement)	Top (Level 1)	354	2.4400	0.003
	Middle (Level 2)	447	2.2210	
	Low (Level 3)	531	2.6505	
QMP2 (Supervisory Leadership)	Top (Level 1)	354	3.5009	0.002
	Middle (Level 2)	447	3.2120	
	Low (Level 3)	531	3.3220	
QMP3 (Supplier Involvement)	Top (Level 1)	354	2.8870	0.034
	Middle (Level 2)	447	2.7660	
	Low (Level 3)	531	3.0625	
QMP4 (Top Management Commitment)	Top (Level 1)	354	2.9103	0.450
	Middle (Level 2)	447	2.770	
	Low (level 3)	531	2.6610	
QMP5 (Training to Improve Product/Services)	Top (Level 1)	354	2.6322	0.625
	Middle (Level 2)	447	2.6270	
	Low (Level 3)	531	2.6014	
QMP6 (Cross-Functional Relationship)	Top (Level 1)	354	3.1111	0.110
	Middle (Level 2)	447	3.2121	
	Low (Level 3)	531	3.0917	
WCC (World-Class Company)	Top (Level 1)	354	3.0168	0.105
	Middle (Level 2)	447	2.9720	
	Low (Level 3)	531	2.8620	
OE (Operational Excellence)	Top (Level 1)	354	3.4722	0.120
	Middle (Level 2)	447	3.4515	
	Low (Level 3)	531	3.4412	
CNFP (Company Non-Financial Performance)	Top (Level 1)	354	2.7458	0.225
	Middle (Level 2)	447	2.6887	
	Low (Level 3)	531	2.6422	
CFP (Company Financial Performance	Top (Level 1)	354	2.7892	0.851
	Middle (Level 2)	447	2.7606	
	Low (Level 3)	531	2.7212	

Table 5. **Results of SEM – Fully Constrained Parameters*)**

Structural Relationship	Top Level Management Sample: Un-standardized Regression Weight (y)	Top Level Management Sample: Critical Ratio	Middle Level Management Sample: Un-standardized Regression Weight (y)	Middle Level Management Sample: Critical Ratio	Low Level Management Sample: Un-standardized Regression Weight (y)	Low Level Management Sample: Critical Ratio	Error (ε)	Residual (ξ)
QMP1 ----> WCC	**0.344**	**12.180**^{s}	**0.344**	**12.180**^{s}	**0.344**	**12.180**^{s}	ε_1=0.019	ξ_1=0.372
QMP2 ----> WCC	**0.070**	**2.581**^{s}	**0.070**	**2.581**^{s}	**0.070**	**2.581**^{s}	ε_2=0.037	ξ_2=0.761
QMP3 ----> WCC	**0.104**	**3.932**^{s}	**0.104**	**3.932**^{s}	**0.104**	**3.932**^{s}	ε_3=0.052	ξ_3=0.521
QMP4 ----> WCC	**0.089**	**3.400**^{s}	**0.089**	**3.400**^{s}	**0.089**	**3.400**^{s}	ε_4=0.021	ξ_4 0.358
QMP5 ----> WCC	**0.163**	**6.352**^{s}	**0.163**	**6.352**^{s}	**0.163**	**6.352**^{s}	ε_5=0.044	
QMP6 ----> WCC	**0.190**	**7.843**^{s}	**0.190**	**7.843**^{s}	**0.190**	**7.843**^{s}	ε_6=0.041	
QMP1 ----> OE	**0.235**	**5.163**^{s}	**0.235**	**5.163**^{s}	**0.235**	**5.163**^{s}	ή1 =0.038	
QMP2 ----> OE	**0.091**	**2.058**^{s}	**0.091**	**2.058**^{s}	**0.091**	**2.058**^{s}	ή2 =0.139	
QMP3 ----> OE	-0.007	-0.155	-0.007	-0.155	-0.007	-0.155	ή3 =0.057	
QMP4 ----> OE	**0.086**	**2.042**^{s}	**0.086**	**2.042**^{s}	**0.086**	**2.042**^{s}	ή4 =0.025	
QMP5 ----> OE	**0.132**	**3.186**^{s}	**0.132**	**3.186**^{s}	**0.132**	**3.186**^{s}		
QMP6 ----> OE	0.042	1.074	0.042	1.074	0.042	1.074		
WCC ----> CNFP	**0.406**	**15.094**^{s}	**0.406**	**15.094**^{s}	**0.406**	**15.094**^{s}		
OE ----> CNFP	**0.407**	**13.228**^{s}	**0.407**	**13.228**^{s}	**0.407**	**13.228**^{s}		
CNFP ----> CFP	**0.796**	**33.059**^{s}	**0.796**	**33.059**^{s}	**0.796**	**33.059**^{s}		

Goodness-of-Fit Measures		Acceptable Parameter Level (Hair et al. 2006)	Desirable Parameter Level (Hair et al. 2006)
Chi-Square Statistic (X^2)	167.672		
Degree of Freedom (df)	15		
Normed Chi-Square (X^2/df)	11.178	1 < x < 5	1 < x < 2
X^2 p-value	0.000	> 0.05	> 0.15
GFI	0.976	Close to 1 is better	
AGFI	0.911	> 0.90	
RMR	0.016	Close to 0 is better	
TLI	0.937	> 0.90	
RMSEA	0.087	< 0.10	< 0.05

- *) Parameters were fixed such that estimated parameters of high/top level management sample were equal to the parameters of middle and low levels management sample.
- s) Boldfaced figures indicate significant paths (CR > 1.96).

Table 6. **Results of SEM – Unconstrained Parameters*)**

Structural Relationship	Top Level (1) Management Sample: Un-standardized Regression Weight (y)	Top Level (1) Management Sample: Critical Ratio	Middle Level (2) Management Sample: Un-standardized Regression Weight (y)	Middle Level (2) Management Sample: Critical Ratio	Low Level (3) Management Sample: Un-standardized Regression Weight (y)	Low Level (3) Management Sample: Critical Ratio	Error (ε)	Residual (ξ)
QMP1 ----> WCC	**0.412**	**7.916** s	**0.394**	**8.834**s	**0.283**	**5.848** s	ε_1 =0.019	ξ_1 =0.344
QMP2 ----> WCC	0.064	1.313	0.071	1.734	0.079	1.712	ε_2 =0.037	ξ_2 =0.737
QMP3 ----> WCC	-0.024	-0.481	0.252	5.847s	0.079	1.807	ε_3 =0.052	ξ_3 =1.243
QMP4 ----> WCC	0.072	1.460	0.019	0.449	0.146	3.377 s	ε_4 =0.021	ξ_1 0.284
QMP5 ----> WCC	**0.203**	**4.059** s	**0.111**	**2.696**s	**0.167**	**3.980** s	ε_5 =0.044	
QMP6 ----> WCC	**0.228**	**5.009** s	**0.159**	**3.993**s	**0.177**	**4.422** s	ε_6 =0.041	
QMP1 ----> OE	**0.381**	**5.518** s	**0.276**	**4.136**s	**0.109**	**2.133**	ή1 =0.038	
QMP2 ----> OE	-0.023	-0.320	0.003	0.077	0.304	4.534 s	ή2 =0.139	
QMP3 ----> OE	-0.311	-4.057 s	0.073	1.539	0.051	0.811	ή3 =0.057	
QMP4 ----> OE	0.193	2.955 s	0.022	0.755	0.159	2.548 s	ή4 =0.025	
QMP5 ----> OE	**0.134**	**2.132** s	**0.090**	**2.428** s	**0.140**	**2.322** s		
QMP6 ----> OE	0.144	2.501 s	0.027	0.587	0.058	1.008		
WCC ----> CNFP	**0.904**	**5.026** s	**0.803**	**4.825**	**0.587**	**5.538** s		
OE ----> CNFP	**0.549**	**2.066** s	**0.181**	**2.480**	**0.156**	**2.351**		
CNFP ----> CFP	**0.886**	**22.783** s	**0.835**	**20.572** s	**0.690**	**16.212** s		

Goodness-of-Fit Measures		Acceptable Parameter Level (Hair et al. 2006)	Desirable Parameter Level (Hair et al. 2006)
Chi-Square Statistic (X^2)	19.024		
Degree of Freedom (df)	12		
Normed Chi-Square (X^2/df)	1.585	1 < x < 5	1 < x < 2
X^2 p-value	0.088	> 0.05	> 0.15
GFI	0.990	Close to 1 is better	
AGFI	0.952	> 0.90	
RMR	0.005	Close to 0 is better	
TLI	0.987	> 0.90	
RMSEA	0.041	< 0.10	< 0.05

- *) Parameters are freed, allowing estimated parameters of high/top level management sample to differ from those of middle level management sample and those of low level management sample.
- s) Significant paths
- Boldfaced figures indicate significant paths for high/top level management sample that are also significant for middle and low levels management sample (CR > 1.96).

Results obtained from the multigroup structural equation modeling (unconstrained parameters) analysis suggest that the research model exhibits a quite satisfactory overall fit. The values of goodness of fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI), and Tucker-Lewis Index (TLI) exceed the recommended level of 0.9, or close to 1. The root mean square residual or RMR, the root mean square error of approximation or RMSEA, p-value, and X^2/df are also exceeding the recommended level (acceptable parameter levels are $1<X^2/df<5$; RMSEA< 0.05; RMR close to 0; and p-value e" 0.05). Since the goodness-of-fit statistics resulting from this analysis is a well-fitting model, the unconstrained model is accepted.

Table 6 also shows the results of structural relationships among the constructs. Three levels of management indicate that critical factors of quality management practices 1, 5, 6 (quality improvement, training to improve products/services, cross-functional relationships) are significantly associated with world-class company practices (H1a, e, f are accepted). Critical factors of quality management practices 2, 3, 4 (supervisory leadership, supplier involvement, top management commitment) are not significantly associated with world-class company practices (H1b, c, d are not accepted). Furthermore, critical factors of quality management practices 1, 5 (quality improvement, training to improve products/services) are associated with operational excellence (H2a, e are accepted). However, the supervisory leadership, supplier involvement, top management commitment, cross-functional relationship (QMP 2, 3, 4, 6) are not significantly associated with operational excellence practices (H2b, c, d, f are not accepted). World-class company practices and operational excellence practices significantly affect company non-financial performance (H3 and H4 are accepted). Company non-financial performance (productivity and operational reliability) has a direct and significant effect on company financial performance (sales, net profit margin, and return-on-assets) —(H5 is accepted).

Table 7 depicts that the alternative model (the unconstrained model) is significantly different from the base model (the constrained model). Therefore, the level of managers' abilities significantly moderates all structural relationships between quality management practices and company financial performance.

Mediation Analysis

Table 8 provides the complete results of the hierarchical multiple regressions predicting the linkage between six critical factors of quality management practices and company financial performance. The results indicate that *the first step* explains 45.4 percent of the variance in company financial performance, F(1, 1330) = 1104.569, p = 0.000, Durbin Watson =1.640. As expected, a majority of the variance explained in company finan-

Table 7. **Comparison of Goodness-of-Fit of the Base Model and the Alternative Model**

	Goodness-of-Fit Criteria			
	Base Model (Constrained Parameters)	Alternative Model (Unconstrained Parameters)	Criteria: Acceptable Parameter Level (Hair et al. 2006)	Criteria: Desirable Parameter Level (Hair et al., 2006)
Chi-Square Statistic (X^2)	167.672	19.024		
Degree of Freedom (df)	15	12		
Normed Chi-Square (X^2/df)	11.178	1.585	1 < x < 5	1 < x < 2
X^2 p-value	0.000	0.088	> 0.05	> 0.15
GFI	0.976	0.990	Close to 1 is better	
AGFI	0.911	0.952	> 0.90	
RMR	0.016	0.005	Close to 0 is better	
TLI	0.937	0.987	> 0.90	
RMSEA	0.087	0.041	< 0.10	< 0.05
Improved Goodness-of-Fit from the Base Model to the Alternative Model				
Chi-Square Statistic (X^2)	167.672-19.024 =148.648		High	
Degree of Freedom (df)	15-12 = 3			
Probability	0.088-0.000 = 0.088		> 0.05	
Conclusion	The alternative model (the unconstrained model) is significantly different from the base model (the constrained model). Therefore, the level of managers (levels 1, 2, 3) significantly moderates all structural relationships between quality management practices and company financial performance.			

cial performance could be attributed to critical factors of quality management practices. Results from *the second step* of these regressions indicate that including the mediators increases the amount of variance explained in company financial performance by approximately 8.7 percent, F(2, 1328) = 125.575, p = 0.000, Durbin Watson = 1.736. Mediators positively predict the company financial performance. The combined variables (independent variable and mediating variables) in *the third step* increase the amount of explained variance in company financial performance by 0.7 percent, F(6, 1332) = 3.540, p = 0.001, Durbin Watson = 1.849. Hence, the mediation occurs. The mediators are significant in the third equation. Therefore, the result of mediation analysis shows that critical factors of quality management practices affect company financial performance through world-class performance in operations (world-class company, operational excellence, and company non-financial performance) (H1-5 are accepted) (Baron and Kenny 1986).

Table 8. **Summary of Hierarchical Multiple Regression Analysis**

				Step 1					
R	**R-Square**	**Adjusted R-Square**	**Std. Error of the Estimate**	**R-Square Change**	**F Change**	**Df1**	**Df2**	**Sig. F**	**Durbin-Watson**
0.674[a]	0.454	0.453	0.3531	0.454	1104.569	1	1330	0.000	1.640
				Step 2					
R	**R-Square**	**Adjusted R-Square**	**Std. Error of the Estimate**	**R-Square Change**	**F Change**	**Df1**	**Df2**	**Sig. F**	**Durbin-Watson**
0.735[b]	0.541	0.540	0.3241	0.087	125.575	2	1328	0.000	1.736
				Step 3					
R	**R-Square**	**Adjusted R-Square**	**Std. Error of the Estimate**	**R-Square Change**	**F Change**	**Df1**	**Df2**	**Sig. F**	**Durbin-Watson**
0.740[c]	0.542	0.548	0.3221	0.007	3.540	6	1322	0.001	1.849

a. Predictors: (Constant), Critical Factors of Quality Management Practices (QMP1-6)

b. Predictors: (Constant), World-Class Performance in Operations (World-Class Company or WCC, Operational Excellence or OE, and Company Non-Financial Performance or CNFP)

c. Predictors: (Constant), Critical Factors of Quality Management Practices (QMP1-6), World-Class Performance in Operations (World-Class Company or WCC, Operational Excellence or OE, and Company Non-Financial Performance or CNFP)

d. Dependent Variable: Company Financial Performance (CFP)

Findings, Limitations, and Conclusions

The study explores the moderating effects of the hierarchical level of managers' abilities on the form and strength of all structural relationships between critical factors of quality management practices and company financial performance. The researcher finds evidence that the hierarchical level of managers' abilities act as a moderating variable among critical factors of quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance. The empirical findings indicate that the goodness-of-fit of the unconstrained model is much better than that of the constrained model, and this is an indicator that the three levels of managers' abilities moderate all structural relationships among the research constructs.

Findings further reveal that world-class performance in operations (world-class company practices, operational excellence practices, and company non-financial performance) positively mediates the impact of critical factors of quality management practices on company financial performance. Findings also point out that three out of six

critical factors of quality management practices are positively associated with world-class company practices and operational excellence practices under the three levels of managers' abilities (top, middle, and low). World-class company practices and operational excellence practices have direct and significant effects on company non-financial performance (productivity, operational reliability). Furthermore, empirical results suggest that there is a positive and significant relationship between company non-financial performance and company financial performance.

The MSEM reveals that the structural relationships have met goodness-of-fit criteria, thus, the interpretation of the impact of critical factors of quality management practices on company financial performance fits with the data. The results of MSEM analysis: (1) support the importance of the level of managers' abilities as a moderator among the research constructs, (2) suggest that the critical factors of quality management practices —company financial performance linked model is appropriate for examining the relationships between six critical factors of quality management practices and company financial performance that oil and gas managers in upstream and downstream sectors can use to establish an effective operations strategy. The results of MSEM show that the model of the study has a great potential for replication by manufacturing as well as service operations.

The hierarchical multiple regression analysis provides additional insights into the indirect contribution of world-class company practices and operational excellence practices (as fully mediators) to company financial performance —sales, net profit margin, return on assets.

The findings of this study should be interpreted by keeping in mind the following limitations. It is important to note that *the first* potential limitation of this study stems from the use of a cross-sectional analysis. Cross-sectional analysis only portrays a particular point of time. The researcher cannot examine the dynamic nature of trade-off changing over time (Silveira and Slack 2001). In addition, the researcher encourages next researchers to think about whether the models of the study vary over time, either because the constructs are theoretically important other times or because the theoretical effect is unstable for some reasons. *The second* limitation relates to the generalizability of the sample of a single industry (Indonesia's oil and gas industry; five digits of SIC Codes) to the larger population of wide variety industries (two digits of SIC Codes) employing the successful quality management implementation for world-class performance in operations. *Third*, one must be cautious in interpreting the findings of this study since the companies' restructuring policy in strategic business units (SBUs) is relatively new —the transition era from cost centers to profit centers. The po-

tential problem with respect to the new policy implementation is a probability that SBUs are lacking in strategic consensus between policy maker (top level managers), middle level managers, and low level managers in the upstream and downstream of oil and gas chains. As a result, the research findings are intended to represent the types of issues faced by strategic business units (SBUs) not experienced in the implementations of TQM, world-class company, and operational excellence, but nonetheless change with the necessity of attaining successful TQM practices in order to develop world-class company and operational excellence while also rising company performance.

In view of the fact that the success of oil and gas industry has a direct impact on the national economy, and the consequences of the realization of new oil and gas Law No. 22/2001 in Indonesia, this study presents new data and empirical insights into the structural relationships among critical factors of quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance in oil and gas companies operating in Indonesia. In conclusion, this study supports the importance of world-class company practices and operational excellence practices as two determinants of company non-financial performance. The results show that decision makers of oil and gas companies in Indonesia can gain considerably from articulating and adapting a comprehensive operations strategy for their TQM implementation (in upstream and downstream sectors) to achieve the world-class performance in operations. The gains that materialize from such a strategy can enhance a company's growth and value and the integration between economic, cultural, and environmental values—the practice of circulation economics (Ingebrigtsen and Jakobsen 2006).

Implications for and Lines of Future Research

The findings of this study have some implications for oil and gas managers considering developing business in world-class orientation. For instance, the findings that the hierarchical level on managers' abilities moderates all structural relationships among critical factors of quality management practices, world-class company practices, operational excellence practices, company non-financial performance, and company financial performance would benefit those managers. In order to enhance the level of managers' abilities, efforts should be directed firstly toward improving the levels of both operational excellences (level of efficiency and productivity) and world-class company practices. The major contribution of the hierarchical level of managers' abilities (as a moderator) is how to make changes in the organizational system. A dichotomy based on hierarchy seems to be suggested by Deming, whereby managers at higher organizational levels are increasingly able to have an impact on, or to formu-

late, systems. Top level managers are considered the most capable of making significant changes because of their broad sources of power and influence. Conversely, lower level managers find it more difficult making significant changes in the system because of bureaucratic control processes that limit their actions —powerlessness or a chronic lack of autonomy.

Compared to the hierarchical level of managers' abilities, the degree of autonomy may be a more comprehensive contribution in reference to a person's ability to influence an organizational system. Autonomy may not only act as a person enhancer to increase internal work motivation, but it may also serve to moderate the extent to which individuals are able to significantly influence a system. Autonomy may be defined as the degree of freedom or discretion a person has over the task domain regarding activities such as determining procedures and scheduling (Ashforth 1990; Hackman and Oldham 1980 in Waldman 1994). In addition, involvement and empowerment of all organizational members (including managers) in cooperative and collaborative (interactive) efforts to achieve quality improvements appear to be a key element to TQM. Besides, at higher levels, the performance of managers is due more to inherent abilities and motivation. Hambrick and Finkelstein (1987) define managerial quality as due in part from their ability and motivation to effectively enact discretion. Specific managerial characteristics involved in enacting discretion may include such factors as cognitive complexity and aspiration level.

The potential implications of this study can also be viewed from the integrated oil and gas chains. Internal development of organization (both upstream and downstream sectors) is deemed an important precursor to adapting to six critical factors of quality management practices (training to improve products/services, quality improvement program, management commitment, supplier involvement, cross-functional relationships, and supervisory leadership). In other words, the mechanism to adapt these critical factors of quality management practices requires organizational members to realize the commitment of continuous process improvement and innovation beyond the job requirements as well as their formal job descriptions. Critical factors of quality management practices –company financial performance link– have to be determined as having beneficial organizational impacts in the long term (to establish streamlined operations in order to reach long-term organizational effectiveness and efficiency) in the oil and gas industry. As Davila et al. (2006) state, "Organization with internal environments that foster a developed portfolio of continuous process improvement and innovations might be able to adapt to external environment changes more fluidly in order to sustain growth." Oil and gas managers should develop work designed on the basis of autonomy which can enable the feeling of free-

dom and power to effect changes in the system. Autonomy enables individuals to demonstrate their own efforts and initiatives, as opposed to being subject to constraints or demands imposed by the system (Hackman and Oldham 1980).

Several lines of future research suggest themselves:

- It would be of interest to conduct research longitudinally to observe the progress of improvement efforts (i.e., by developing Antecedents, Behavioral, Consequences analysis; or by using triangulation method).
- It might be useful to investigate the moderating impacts of the hierarchical level of managers' abilities on the relationships between critical factors of quality management practices on company performance for companies coming from a wide range of industries. The sample is restricted to only a single country and a single industry, so it would be strongly recommended that data are gathered from various countries in the ASEAN region (Association of Southeast Asian Nations or Ten Nations One Community —Indonesia, Singapore, Malaysia, Brunei Darussalam, Thailand, Philippines, Cambodia, Laos, Myanmar, Vietnam) including various manufacturing and services industries. As the data in this study were collected from top, middle, and frontline managers of organizations on the basis of their subjective evaluations, objective performance indicators should also be employed in the analysis.
- A detailed comparison between the upstream and the downstream SBUs of oil and gas companies that show similarities and differences between the two structural relationships model would be worthwhile.

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